

OUTDOOR RECREATION RESEARCH ON NATIONAL FORESTS  
IN REGION 1: A PROJECT ANALYSIS AND WORKING PLAN  
3

L. D. Love

UNITED STATES DEPARTMENT OF AGRICULTURE  
FOREST SERVICE

4220  
April, 1962

OUTDOOR RECREATION RESEARCH ON  
NATIONAL FORESTS IN REGION 3

By

L. D. Love, Research Forester

A PROJECT ANALYSIS AND WORKING PLAN



**OUTDOOR RECREATION RESEARCH ON  
NATIONAL FORESTS IN REGION 3**

**By**

**L. D. Love, Research Forester**

**A PROJECT ANALYSIS AND WORKING PLAN**

**Rocky Mountain Forest and Range Experiment Station  
Raymond Price, Director  
Fort Collins, Colorado  
April 1962**

**LIBRARY COPY  
ROCKY MTN. FOREST & RANGE  
EXPERIMENT STATION**

## CONTENTS

	<u>Page</u>
Introduction . . . . .	1
Southwestern Recreational and Scenic Opportunities . . . . .	3
General Description of Forests in Region 3 . . . . .	7
Recreation Use Zones . . . . .	9
Summary of Outdoor Recreation Problems by Use Zones . . . . .	11
Related Problems on Region 3 Forests . . . . .	11
Outdoor Recreation Research Program Recommendations . . . . .	14
Studies for Immediate Attention . . . . .	18

OUTDOOR RECREATION RESEARCH ON  
NATIONAL FORESTS IN REGION 3

By

L. D. Love, Research Forester

A PROJECT ANALYSIS AND WORKING PLAN

INTRODUCTION

This analysis is preliminary in scope. It is intended to provide a springboard for an Outdoor Recreation Research program and to form a basis for the selection of specific studies to be undertaken in the near future.

Three documents furnished the basis for this analysis; S. T. Dana's 1957 "Problem Analysis for Research in Forest Recreation," the 1959 regional multiple use management guide, and the 1960 National Forest Recreation survey for the Southwestern Region both prepared by the staff of U.S. Forest Service, Region 3. No special surveys were conducted to provide information for the analysis.

The Recreation Research problems recognized by Dana were considered from the standpoint of their applicability to each of the three recreation use zones in Region 3 (see section on Recreation Use Zones). Those that were considered to apply were related to the conditions prevalent in each use zone. Recreation problems common to the forests in each zone were evaluated and finally program recommendations made.

In this initial statement, no attempt is made to justify the importance of outdoor recreation. Certain peculiarities do exist, however, in the recreational use of Region 3 forests which either do not exist

elsewhere or are characterized by the climate, terrain, and location of population centers. Many people move to the Southwestern Region to take advantage of the mild and warm climate. Others visit the region to observe and study historical ruins, geological formations, Indian cultures and wildlife in a natural setting. The cool mountain forests offer an escape from the summer heat of those towns and cities located in the desert areas.

The population of Arizona grew from 749,587 people in 1950 to 1,302,161 persons in 1960; an increase of 74 percent. The 1960 population of Phoenix and environs was 663,510, and for Tucson and vicinity it was 265,660 people. In these two metropolitan complexes reside 71 percent of the people in Arizona. The population of New Mexico increased from 681,187 people in 1950 to 951,023 inhabitants in 1960; a growth of 40 percent. The 1960 population of greater Albuquerque was 257,675 persons. In this urban complex reside 27 percent of the people in New Mexico. It is estimated that the population in Arizona and New Mexico will increase from 2,253,184 to over 5 million by the year 2000. The 1960 population of El Paso, Texas, was 276,687 persons. A portion of these people use the National Forests in Region 3 for recreation purposes.

Visitor day's use of National Forests in Arizona and New Mexico are increasing at a rate faster than increases in population (figure 1). Population increases provide a potential demand for outdoor recreation on National Forest lands, but other factors are more responsible for the acceleration of the public's present day use of these lands. These factors are (1) more leisure time available (paid vacations, for example), (2) greater disposable income and (3) improved ease of traveling, especially by modern highways and automobiles. Likewise, these factors play an important

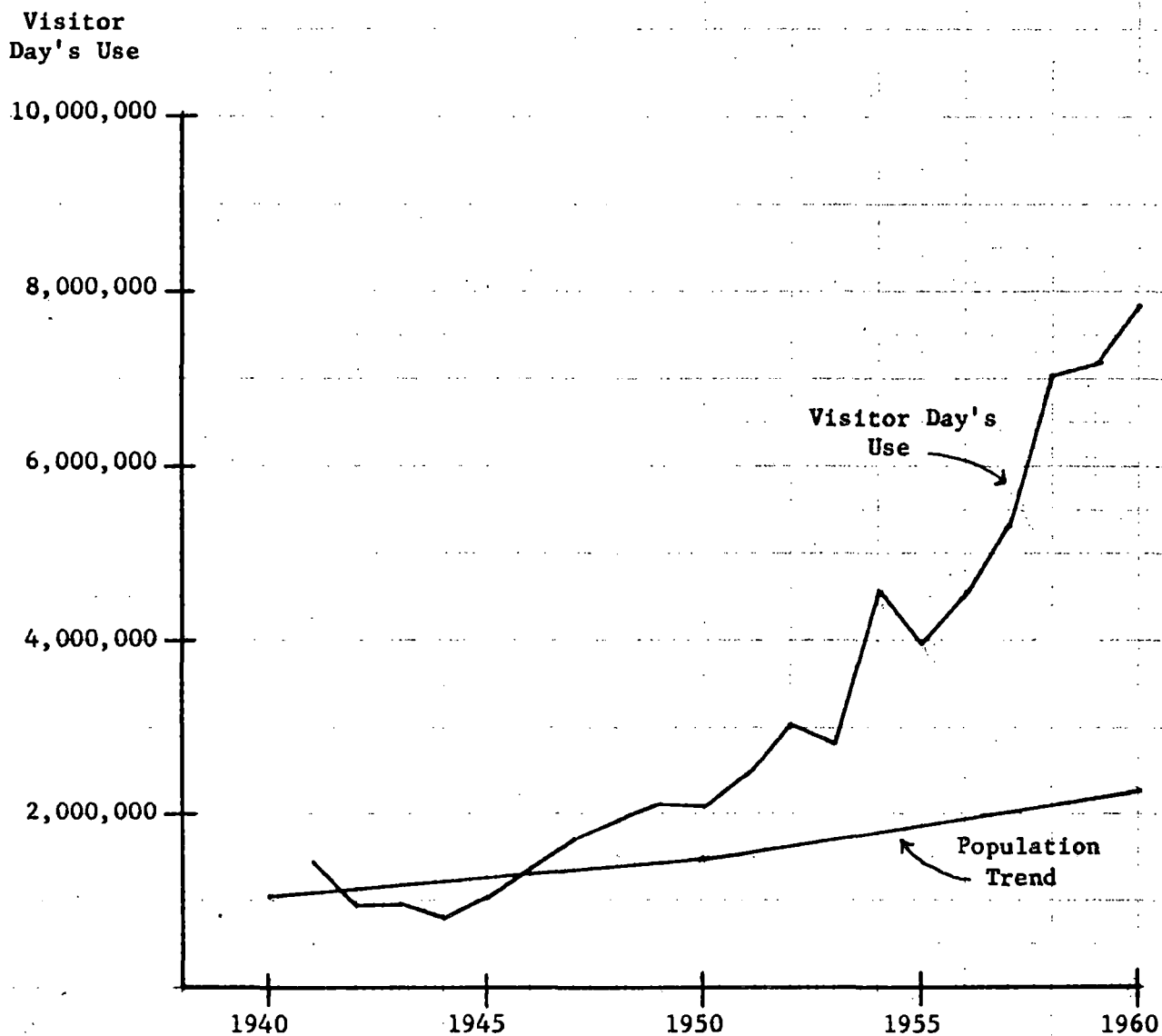


Figure 1.--Total population and visitor day's use of National Forests  
in Arizona and New Mexico.

role in encouraging out-of-State visitors to travel to the Southwest, thus contributing to the acceleration of use.

### SOUTHWESTERN RECREATIONAL AND SCENIC OPPORTUNITIES

Although Arizona and New Mexico were the last two States to become a part of continental United States, they, nevertheless, were the first to be settled by Europeans. This early settlement overrode existing Pueblo Indian occupancy that has prevailed for over 1500 years. It is only during the past 100 years that extensive use and occupancy of the lands of Arizona and New Mexico has occurred. This has led to a mixture of cultures and customs that presently are both unique and exotic when compared to other settled portions of the United States.

A visit to the Southwest provides a cross section of a variety of Indian tribal customs, old world cultures and religions, and present day bustling industrial activity. A new world superimposed on an old, where the interchange of cultures has resulted in a mixture that is characteristically southwestern from the architecture of dwellings and commercial buildings to the vast and modern highway, irrigation and power systems. This is a land where ancient petrified trees lie exposed, where the geological history of the earth is written in a mile deep canyon, where Indian ruins stand as mute reminders of past human activity, where recent volcanic activity leaves the land stark and bare, where the native vegetation reflects a stable and uniform climate, where a verdant and variform forest covers rugged mountain slopes, and where remote primitive and wild areas provide solitude and peace. Such a southwestern visit adds excitement, enjoyment and a personal sense of satisfaction to both residents and nonresidents alike and goes far to alleviate the pains and struggles of present-day living.

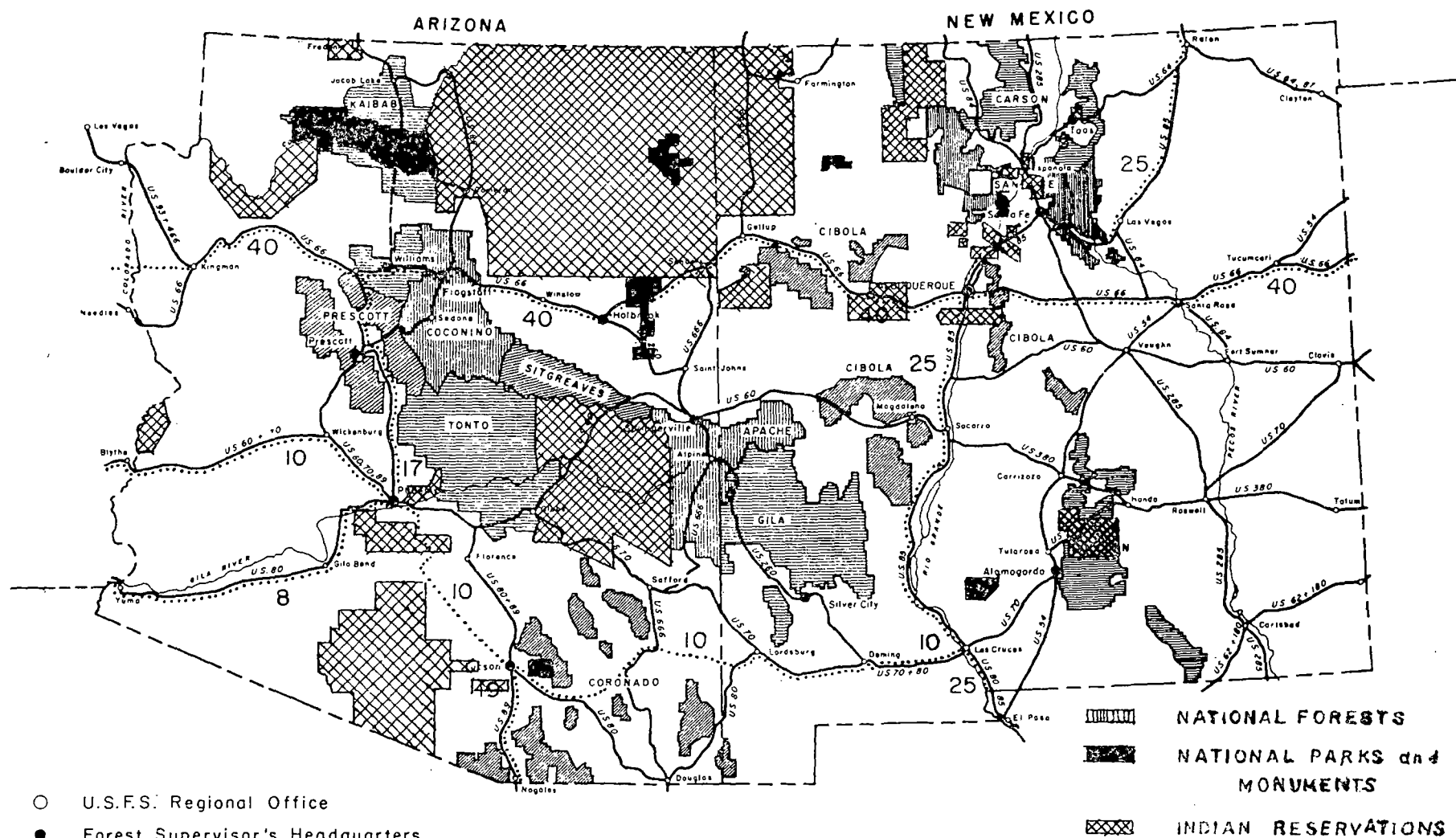


A glance at Figure 2 illustrates the juxtaposition of the various public lands that provide recreational and scenic opportunities in Arizona and New Mexico. A modern highway system together with air, bus and rail travel provide easy access from one point of interest to another. To the lands shown should be added several small and isolated National Monuments, large reservoirs along the Pecos, Rio Grande, Gila, Salt and Colorado Rivers, a myriad of small natural and artificial lakes and ponds, and winter sports areas located in the higher mountain masses. Many private resorts both in the mountains and in the desert supply recreational opportunities from horseback riding to sun bathing, and nearby Mexico provides easy access and adventuresome travel to its major interior and coastal cities. These various opportunities, together with a salubrious climate make available to the recreationist choices of interest seldom prevailing elsewhere and of a truly southwestern flavor.

The distribution of National Forest lands in Arizona and New Mexico is such that they either (1) form a base for recreationists to explore a nearby Indian ruin, visit a National Park, swim, fish or water ski or (2) provide a series of overnight stops between visits to widely separated points of interest. The use of National Forest recreation sites is closely related to and intimately tied to the recreational opportunities of the entire region. For example, a winter vacation in southern Arizona is enlivened by the availability of nearby National Forest recreation sites; a summer's trail ride to a wilderness area is enhanced by well kept trails and a satisfying aesthetic environment.

National Forest recreation sites are largely dispersed throughout the forests and are located with reference to points of interest on

THE SOUTHWESTERN REGION (3)



accessible sites for the convenience of the public. Effort is made to avoid overcrowding by limiting the development density to 3 family units per acre and by establishing another site in the nearby vicinity rather than by increasing the density of units. In contrast, picnic sites are severely restricted at National Parks and Monuments and, where campsites are developed, the density of 5 to 10 family units per acre is used. To some extent National Forest recreation sites alleviate the crowded conditions of National Park and Monument sites particularly where the former are located along approach roads.

Ever since the turn of the century, Indian Pueblos and reservations have been a mecca for tourists but it is only recently that the Navajos and Fort Apache Indians have developed recreation sites on their reservations for camping, picnicking, fishing, and hunting. In addition, they have improved roads and built other tourist accommodations. These developments on Indian lands have had the effect of raising rather than lowering the recreational impact on adjacent National Forest sites by attracting visitors to the vicinity.

The State parks of Arizona are two in number and total four acres. Maricopa and Pima counties through cooperative agreements with the Forest Service make annual deposits for the construction of roads and recreation facilities on nearby National Forests. In 1958 Arizona activated a State Parks Board which has devoted its time to a study of possible recreation sites.

New Mexico has six intensively used State Parks totaling 5,041 acres. These parks are operated on a charge basis by State employed full-time custodians. New Mexico counties have done little in the way of

recreation development, but the State Parks Commission is establishing a program to assist counties with such projects.

Oklahoma and Texas have good State Park systems, but developed sites are concentrated in the central and eastern sections of both States in areas quite remote from the western portions within the Southwestern Region.

Both the New Mexico Department of Game and Fish and the Arizona Game and Fish Department have been active in developing water impoundments for fishing purposes. Where these developments are located on National Forest land, the Forest Service is asked to develop and administer recreational facilities for public use at the reservoir sites.

Several wildlife refuges have been established in connection with the operation of Bureau of Reclamation reservoirs located along the major river systems. These provide boating and fishing, and are located some distance away from National Forest lands. Private capital has usually provided the facilities for these activities.

The trend toward year-round use of the National Forests of the Southwest is becoming more prevalent each year. This use is fostered by local dude ranches as well as by Chambers of Commerce who advertise extensively the desirability of winter vacations. This has created a demand for more recreational sites in the low elevation woodland and semi-desert zones which are used during the fall, winter and spring months. Boating and water sports have lengthened the period of use on National Forest lands, such as the Tonto in Arizona, where water supply reservoirs are used for boating for at least 10 months out of the year. Recreation sites developed in the semi-desert zone adjacent to these lakes were formerly used lightly during the summer months, but boating has changed this

use completely, and on regatta days all facilities are taxed far beyond their capacity. Forests at higher elevations are receiving an increasing volume of recreation use during the winter months through greater public participation in winter sports and in scenic drives on roads now kept open.

In summary, Southwestern recreational and scenic opportunities are many and varied, of a character not found elsewhere in the United States and available for year-round enjoyment. Public recreational developments are designed to take advantage of the modern transportation facilities, climate, outstanding points of interest, National Forests in a variety of settings, lakes and ponds, and the culture and customs of the local people.

### GENERAL DESCRIPTION OF FORESTS IN REGION 3

The National Forests in Region 3 encompass a total net area of 19,881,596 acres, of which 11,328,496 acres are in Arizona and 8,553,100 acres in New Mexico. Elevations range from less than 3,000 feet to over 13,000. Annual precipitation varies from less than 6 inches in the desert areas to 34 or more inches in the high mountains and occurs mainly in two periods. Summer rains, which are relatively intense but of short duration, occur in July, August and September. More gentle winter storms of several day's duration occur from November to February. Winter moisture often falls as snow especially at the higher elevations (above 7,000 feet). Annual precipitation is deficient about 30 percent of the time causing severe drought conditions. Annual temperature ranges are great, ranging from maxima of over 100°F. to minima of -20°F.

The National Forests are the headwaters of many tributary streams of the Rio Grande and Colorado River systems. A major tributary is the Salt River in Central Arizona. Storage reservoirs have been constructed on all important drainages and provide water for irrigation, municipal and industrial uses.

Recreation is one of five major uses of National Forest lands and seldom conflicts with the other uses. In fact, the presence of other uses enhances recreational values and often makes a forest visit more interesting and enjoyable.

Livestock grazing is a major use of the National Forests. In 1960 about 70 percent of these lands were grazed under 3,303 paid permits for 242,921 cattle and 135,225 sheep. This use amounted to 1,931,716 cow months and 496,974 sheep months of grazing. In addition, 5,379 animals were grazed under free-use permit.

From about 5 million acres of commercial timber lands in the National Forests, 329 million board feet of timber were cut in 1959 (249 million in 1960). The estimated allowable annual cut of saw timber is 366 million board feet. The present market value of timber products from the forests in Region 3 is estimated to be \$33 million.

The National Forests in Region 3 provided a habitat for an estimated 316,000 big game animals in 1960. Hunter and fisherman visits in the National Forests increased from 234,000 in 1950 to about 1,213,600 visits in 1960. Approximately 62,000 big game animals were harvested in 1960.

There were 1,714,417 acres of private and State lands within the exterior boundaries of the National Forests. This amounts to 8 percent of the total area.

Visits to the National Forests in Region 3 to enjoy the climate and scenery, to fish, hunt, camp or pursue other recreational activities have increased from about 1.6 million in 1950 to 8.2 million in 1960. There are 15 wilderness, primitive and wild areas covering 1,681,960 acres. The proximity of the National Forests to population centers, the development

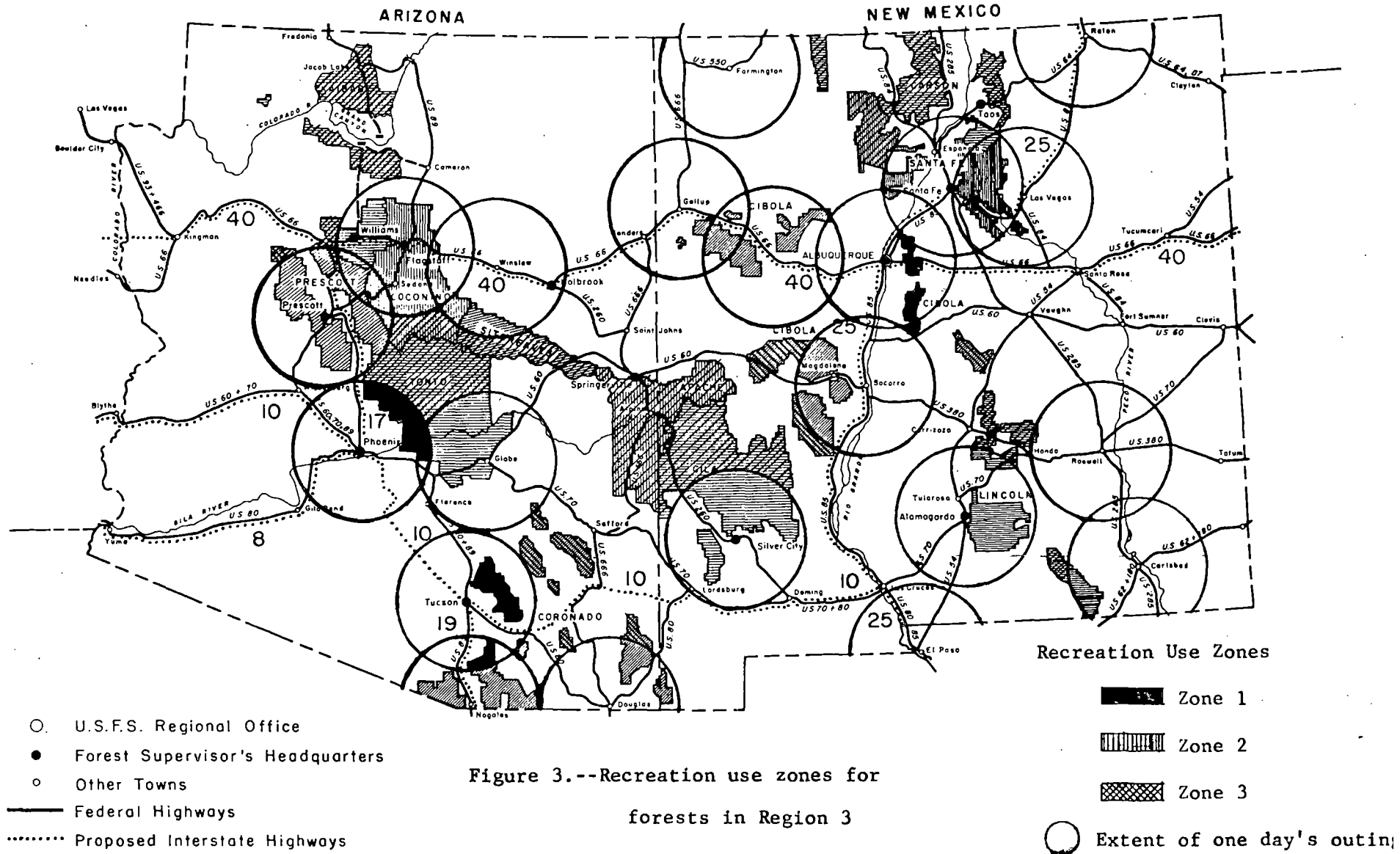
of new and faster highways and the continued improvement of air travel facilities indicate that recreation use will increase. It is estimated that recreation visits to the National Forests will jump to 24,489,000 visits in 1976 and will require 43,524 family units at camp and picnic sites. Accompanying the expected increase in the number of people using the National Forests is a substantial increase in the risk of damage to all resources from forest fires.

#### RECREATION USE ZONES

The National Forests of Region 3 were divided into three recreation use zones (figure 3). These zones were determined through the use of procedures developed by the California Outdoor Recreation Commission in which distances from centers of population serve as a basis for delineating use zones. A one-way distance of about 40 airline miles from the center of population was found to be the average distance people would travel for a day's outing. Travel distances greater than 40 airline miles usually involved over-night stops of one or more nights duration. Day use zones were outlined on a map of Region 3 forests for towns and cities of 5,000 or more population. For the major centers of population, Phoenix, Tucson, Albuquerque, and El Paso, an over-night use zone was delineated using a one-way travel distance of 125 airline miles. Where this latter use zone overlapped the day's outing zone of towns with populations of 5,000 or more (5-40,000) a second zone was formed. In like manner where the over-night use zone from major centers of population overlapped the day's outing zone of towns and villages with populations of less than 5,000, a third use zone was recognized. The three use zones are:

Zone 1. One day's outing from major population centers  
of over 200,000.

# INTERSTATE HIGHWAY SYSTEM THE SOUTHWESTERN REGION (3)





Zone 2. Over-night use from major population centers plus one day's outing from local population centers of over 5,000 (5-40,000).

Zone 3. Over-night use from major population centers plus one day's outing from local population centers of less than 5,000.

A major characteristic of the region is the concentration of people in four large cities. In each city the population exceeds 200,000. This concentration of people exceeds the population of nearby towns and small cities by 5 to 40 times and creates a definite and wide span between centers of population that has a marked influence on recreational use of the National Forests. It is estimated that 25 percent of the leisure time of people living in the four major cities is spent in zone 1 (figure 3) outside city limits and 15 percent of the leisure time in zones 2 and 3. It is anticipated that, by 1980, leisure time spent in zone 1 will increase to 35 percent and in zones 2 and 3 to 25 percent. (Based on California Outdoor Recreation Commission studies.)

Another characteristic is that many of the recreation sites are accessible yearlong from both local and major population centers. Thus recreational use of one kind or another is of short duration but frequent in zones 1 and 2 (figure 3) but of long duration and infrequent in zone 3 due to higher elevations and to winter climate. In all three zones, recreational use is intensified during the summer months by nonresident users traveling greater distances whose visits are of long duration but infrequent.

## SUMMARY OF OUTDOOR RECREATION

### PROBLEMS BY USE ZONES

Each of the three recreational use zones have a different pattern of recreational use. This difference places emphasis on the diversity of outdoor recreation problems and their urgency of solution. Thus, a single problem occurring in one zone may or may not occur in another. If it does, it may not require solution in the same time period. Present recreational use of the forests in the three use zones varies according to climate, accessibility, associated points of interest, location of major centers of population and presence or absence of game and fish. These factors have a direct bearing on the recreation research needs for each zone.

To segregate the outdoor recreation problems for the forests in the use zones, a priority system was employed. This system first considered the Recreation Research problems recognized by Dana as they applied to each zone. This was followed by consideration of problems of regional importance as they related to the patterns of recreational use in each zone. On a subjective basis, priorities were assigned to each outdoor recreation problem based on the characteristics of each use zone as described in the foregoing general statement.

Table 1 summarizes the priority of outdoor recreation problems recognized in each zone.

### RELATED PROBLEMS ON

#### REGION 3 FORESTS

Several problems occur on the forests of Region 3 that are related to Recreation Research but not a function of it. Principally these

**Table 1.--Priority of specific outdoor recreation problems by use zone  
on National Forests in Region 3.**

Problems	Priority		
	Zone	Zone	Zone
	1	2	3
Problems of various kinds and concentrations of recreational use on existing and new recreation sites . . . . .	1	2	3
Problems of the compatibility of timber utilization range and wildlife management on recreational uses . . . . .	--	3	2
Problems of the location, layout, design and equipment for recreational sites . . . . .	2	1	1
Problems of increased recreational use on watershed conversion projects. . . . .	--	4	5
Problems relating to the concentration of recreational sites on watershed conditions . . . . .	4	5	6
Problems of personal and social values resulting from recreational use . . . . .	3	6	4
Problems relating to recreational use and human behavior . . . . .	5	--	--

problems deal with forest protection and to some extent are influenced by recreational use. They apply particularly to recreation areas but are not confined to them.

The related problems are:

1. Problems connected with early identification of trees and other plants particularly susceptible to attack by insects and diseases.
2. Problems dealing with recreational use as a cause of forest fires.
3. Problems of increased recreational use on watershed restoration projects.
4. Problem of combining an educational program with recreational use of the National Forests.
5. Administrative problems of recreational sites such as sanitation, layout systems, type and quality of facilities, management of wilderness areas and the compatibility of different recreational uses on the same site.

Other problems of a general nature are those dealing with inventories of recreational sites on National Forest lands, present and potential demands for different kinds of recreational facilities, cooperation with other agencies to determine areas of responsibility and to organize opinion surveys of public attitudes. Problems of this sort are inherent in any program; consequently, they are not given specific consideration here.

## OUTDOOR RECREATION RESEARCH

### PROGRAM RECOMMENDATIONS

The seven problems occurring in the three recreational use zones are recommended for study by research. Inherent in each problem are several individual studies. These studies relate to the overall problem. A detailed description of the seven problems on which studies are recommended, follows:

1. Problems of various kinds and concentrations of recreational use on existing and new recreation sites.

Problems relating to the optimum number of picnic or camp units to be placed in a delineated area under Southwestern conditions of soils and vegetation are widespread throughout the National Forests. Information is needed on the patterns and intensities of use of recreation sites as affected by such factors as weather, location and arrangement of facilities, time of day, and the age and sex of the users. This information will aid in evaluating potential sites and in deciding the type of advanced preparation needed. To expand and maintain optimum recreation use, problems exist on what species or combination of species of grasses, shrubs, and trees will or will not thrive under heavy recreational use. Also, problems relating to soil types are prevalent; kinds, density, volume, and vigor of vegetation they will support; and the effect of soil compaction has on soil stability and vegetation. Solutions to these problems

will aid in determining what the permissible recreational use load is on the limited number of desirable sites.

2. Problems of the compatibility of timber utilization, range and wildlife management on recreational uses.

Problems occur dealing with the development of opportunities for additional recreation through timber harvest, wildlife management, water development, and other resource activities under Southwestern conditions. Solution of these problems will lead to the development of general planning guides outlining how to effectively and efficiently integrate forest recreation with other forest uses through multiple use management plans. The point at which recreation use conflicts with one or a combination of other uses such as timber harvest, grazing, wildlife, and water, needs to be determined. The use of sanitation cuts to enhance the forest environment, to control forest insects and diseases, and to improve the aesthetic setting of a recreation site are related problems.

3. Problems of location, layout, design and equipment for recreational sites.

Studies involving the criteria for the location, layout, design, and equipment of recreational sites of different kinds are needed. Such information will be helpful in determining what the requirements are for recreation sites in different vegetation environments. Such studies should include determination of the species, sizes, and distribution of trees, shrubs, and herbs that should be used both in the layout of the new areas and the rehabilitation of wornout areas. Studies of the most effective designs and materials to use in the construction of recreational facilities such as tables, grates,

toilets, garbage containers, barriers, and water supply and sewage disposal systems are important.

4. Problems of increased recreational use on watershed conversion projects.

The conversion of forest watersheds through removal of all trees, to shrub or grass cover to improve water yields set the stage for increased (or possibly decreased) recreational use. By opening up the forest stand, wildlife habitat is improved and accessibility to converted areas increased.

Problems occur relative to the recreational use of the converted areas, the facilities needed to accommodate this use, including educational displays and exhibits, the timing of recreation developments in relation to the conversion program and the possible modification of the conversion program to more satisfactorily meet recreation demand.

5. Problems relating to the concentration of recreational sites on watershed conditions, including municipal watersheds.

In the planning and development of camp and picnic grounds the tendency has been to locate them in a series along a stream or to group them on open bench-like areas, or to concentrate them in a mountain "oasis". Information is needed on the effect that individual camp and picnic grounds, located in waterfront and nonwaterfront zones, have on water quality through the deposition of sediment and other debris in the stream channels.

Existing problems on municipal watersheds are: the effect of camp and picnic grounds on water quality, and the extent to which this influence affects recreation opportunities and water supplies.

6. Problems relating to recreational use and human behavior.

To further recreational use of forest lands, studies are needed to determine the motives that influence a person in desiring a certain kind of recreation; the reasons why he behaves as he does while engaged in a recreational activity; the influence of different kinds of recreational experiences on an individual's physical, mental and moral conditions, and their effect on him as a citizen in the society in which he lives.

7. Problems of personal and social values resulting from recreational use.

Forest recreation is one of the most effective means of promoting personal development physically, mentally, and morally. Specific questions to be answered are: will recreational experiences in a forest environment improve our physical and mental health enough to reduce the steadily growing cost of medical services, hospital, and mental institutions? Will they reduce juvenile delinquency so that we will need fewer detention homes and industrial schools? Will they help to make the individual a better human being and a more effective member of society?

All of the problems recommended for research study will require the development of procedures and techniques to adequately measure the various factors involved in each problem. For example, there is need for reasonably reliable statistics on the kind and volume of recreation use on recreation sites and areas. Reliable statistics are needed to facilitate planning, organization, financing, and other phases of recreation administration. The working of methods may require the first few years of a particular recreation



research study. Although the solution of all seven problems occurring in the use zone merits early attention, the task is too great to undertake them all immediately.

#### STUDIES FOR IMMEDIATE ATTENTION

Region 3, the Coconino National Forest and the Rocky Mountain Station are presently engaged in a multiple use evaluation study of watershed treatment on the Beaver Creek drainage south of Flagstaff, Arizona. The study involves the evaluation of water yields, range forage production, timber growth and wildlife populations but does not include the evaluation of recreational opportunities. Beaver Creek drainage is in recreational use zone 2 (figure 3). Two high priority studies could be undertaken that would provide evidence of the effect of watershed treatment on recreational opportunities.

One study would deal with an evaluation of criteria used to classify and select new recreation sites in the pine and woodland types of northern Arizona. An inventory would be made of existing recreation sites where records have been kept of the number of visits, visitor day's use and length of stay. From the inventory data, the major objective of evaluating those factors associated with recreational use can be accomplished. This will lead to the development of a prediction mechanism to be used to estimate recreational use on Beaver Creek and thus become a part of the multiple use evaluation study.

As a measure of recreational use, a second study would involve the determination of hunter use, success and length of visit in the Beaver Creek drainage area. Information would be gathered on the number of hunters and their residences, the kind of game they were after, their success, length of

time in the area, camp location and type of camping equipment used. The recreational use of converted and untreated areas would be ascertained. This study would be done in cooperation with the Arizona Game and Fish Department, and U.S. Fish and Wildlife Service, the Coconino National Forest and other interested parties.

Another study of high priority that could be undertaken immediately by research personnel deals with problems of various kinds and concentrations of recreational use on existing recreation areas (table 1.). At first the study would be limited to a study of the patterns of use on selected recreation sites. This first step will determine and establish patterns of recreation use on existing recreation sites in order to identify key observations to be made during succeeding studies dealing with methods of measuring recreation use, effects of recreation use on resources, and the economic, social and personal values of outdoor recreation.

The above three studies are all that could be undertaken at the present time. It is estimated that these studies would involve a total of 6 man months of the time of recreation research personnel.